

Clean Water State Revolving Fund Green Project Reserve
- Preliminary -



City of Ashton Wastewater Facility Upgrade Project
SRF Loan #WW1701 (pop. 1084)
\$4,900,000

Preliminary Green Project Reserve Justification

Categorical GPR Documentation

1. INSTALL NEW ENERGY-EFFICIENT AERATORS AND MIXERS WITH PREMIUM MOTORS IN AERATED TREATMENT PONDS (Energy Efficiency). Business Case per GPR 3.2-2: *if a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case (\$xxxx).*
2. INSTALLS ENERGY-EFFICIENT EFFLUENT TRANSFER PUMP IN NEW EFFLUENT PUMP STATION AND REPLACEMENT IRRIGATION PUMP (Energy Efficiency). Business Case per GPR 3.2-2: *if a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case (\$xxxx).*

1. NEW ENERGY-EFFICIENT AERATORS & MIXERS¹ (PRELIMINARY)

Summary

- A winter storage pond will be constructed and treated wastewater will land applied during summer months to eliminate a stream discharge and to avoid permitting issues.
- Total Loan amount = \$4,900,000
- Estimated Categorical energy efficient (green) portion of loan = **x%** (\$**xxx**)
- Annual Energy savings = **xx%**



Existing Lagoon

Background

- A four-cell lagoon provides secondary treatment through four (4) 5 HP Aeromix Tornado aspirating aerators in Lagoon No. 1 and two (2) more aerators in Lagoon No. 2.
- The aerators are expensive to maintain. Common repairs include replacement of the hollow shaft and lower bearing at a cost of about \$3,000 every two years. Motors have to be replaced every three years at \$450 each.
- The aerators are also expensive to operate, being powered by standard efficiency motors.
- There are short-circuiting issues due to poor mixing.

Energy Efficiency Improvements

- Currently Six (6) 5 Hp aerators with standard efficiency motors are used for mixing and oxygen transfer = 30 Hp total. The aerators run for an average of **X** hours daily; therefore the energy consumed on an annual basis by the current system = (**X** hrs/da)(365da/yr)(30 Hp)(.745kW/Hp) = **XX** kWh/yr.
- The project will replace the current system with three (3) new 5 Hp aerators with energy-efficient motors, and three (3) fractional Hp mixers. The new aerators will run for **Y** hours daily; therefore the energy consumed on an annual basis by the proposed aerators = (**Y** hrs/da)(365da/yr)(15 Hp)(.745kW/Hp) = **YY** kWh/yr.
- Therefore the total power requirement of the new system = Aerators + Mixers = **YY** kWh/yr + **Z** kWh/yr. = **ZZ** kWh/year.
- The annual power savings = total power use for the old system vs upgraded system. The results are in Table 1.
- The calculated annual power savings is **xx** kWh/year.
- The annual cost savings is = annual power savings (**xx** kWh/year) (\$0.**xx** per kWh) = \$**xxxx**/yr.
- The payback period per aerator = **X** years.



Lagoon Mixing

Conclusion

- Reducing the number of aerators by using new premium efficiency aerators and fractional Hp mixers, the City reduces their power needs by approximately **xxx** kW-hr per year and annual power costs by approximately \$**xxxx** each year. This represents a **xx%** overall savings per year in energy and costs.
- **GPR Costs:**
Aerators + Mixers = \$**XXX** + **xxxx** = \$**YYY**
- **GPR Justification:** Business Case per GPR 3.2-2: *if a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case.*

¹ Preliminary – will be updated at the time of design completion

2. ENERGY EFFICIENT PUMPS² (PRELIMINARY)

Summary

- A pond will be constructed to store treated effluent in the winter and land applied as irrigation during the summer months. This will eliminate the existing stream discharge and avoid permitting issues.
- Total Loan amount = \$4,900,000
- Estimated Categorical energy efficient (green) portion of loan = **x%** (\$**xxx**)
- Annual Energy savings = **xx%**



Background

- A new pump station will be installed to transfer treated effluent from the treatment lagoons to the new winter effluent storage pond.
- The project would also replace the existing obsolete and inefficient irrigation pump and motor with a new premium energy-efficient pump and motor.

Results

GPR-eligible items are (i) the premium pumps to transfer treated wastewater from the lagoons to the land application site, and (ii) the new premium energy efficient standby pump for the existing irrigation pump station.

(i) Effluent Transfer Pumps

- The effluent pump station consists of three (3) pumps to pump the design maximum day flow of 0.405 MGD from the lagoons to the winter storage pond.
- The Baseline Standard Practice (BSP) is a pump with an Epack motor of efficiency = **x%**; energy usage = **xx** kWh/year.
- The new transfer pumps will have premium energy-efficient motors, efficiency = **y%**; energy usage = **yy** kWh/year.
- ∴ Energy Reduction = BSP **xx** kWh/yr – New pumps **yy** kWh/yr = **XX%** reduction
- ∴ Payback Period = Cost difference between Epack pump & energy efficient pump ÷ \$/year savings = **Z** years



(ii) Irrigation Pump

- A standby premium energy-efficient standby irrigation pump will be provided.
- The Baseline Standard Practice (BSP) is a pump with an Epack motor of efficiency = **x%**; energy usage = **xx** kWh/yr
- The new transfer pumps will have premium energy-efficient motors, efficiency = **y%**; energy usage = **yy** kWh/year.
- ∴ Energy Reduction = BSP **xx** kWh/yr – New pumps **yy** kWh/yr = **XX%** reduction
- ∴ Payback Period = Cost difference between Epack pump & energy efficient pump ÷ \$/year savings = **Z** years

Conclusion

GPR Costs:

$$\begin{array}{rcl} \text{Transfer pumps (3)} & = & \$\text{xxxxxx} \\ \text{New Irrigation Pump} & = & \$\text{xxxxxx} \\ \text{Total} & = & \$\text{xxxxxx} \end{array}$$

- GPR Justification:** Providing premium energy efficient pumps is Business Case GPR-eligible per Section 3.2-2³: *if a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case.*

² Preliminary – will be updated at the time of design completion

³ Attachment 2. EPA Guidance for Determining GPR Eligibility for FY12 SRF Projects